What is claimed is:

1. A method of inspection of a first pattern on a specimen for defects against a second pattern that is intended to be the same, said second pattern has known reflected darkfield and brightfield images, said method comprising the steps of:

a. illuminating the same point of said first pattern on said specimen with both darkfield and brightfield illumination;

b. detecting a reflected darkfield image from said first pattern;

c. detecting a reflected brightfield image from said first pattern;

d. comparing said reflected darkfield image of step b. against said reflected darkfield image from the same point of said second pattern to develop a reflected darkfield difference signal;

e. comparing said reflected brightfield image of step c. against said reflected brightfield image from the same point of said second pattern to develop a reflected brightfield difference signal;

f. processing said reflected darkfield and brightfield difference signals from steps d. and e. together to unilaterally determine a first pattern defect list.

2. A method of inspection as in claim 1 further including the step of:

g. post processing said first pattern defect list of step f. to identify and remove known non-performance degrading surface features from said first pattern defect list.

3. A method of inspection as in claim 1 wherein step a. illumination is provided with separate darkfield and brightfield illumination sources.

4. A method of inspection as in claim 3 wherein said separate darkfield and brightfield illumination sources provide illumination of different frequencies.

5. A method of inspection as in claim 4:

wherein said darkfield illumination source provides narrow band illumination; and

step b. includes the step of:

h. passing said reflected darkfield image through a spatial filter to enhance defect detection.

6. A method of inspection as in claim 1:

wherein said specimen is optically transmissive and said second pattern has known transmitted darkfield and brightfield images;

said method further includes the steps of:

i. detecting a transmitted darkfield image from said first pattern;

j. detecting a transmitted brightfield image from said first pattern;

k. comparing said transmitted darkfield image of step i. against said transmitted darkfield image from the same point of said second pattern to develop a transmitted darkfield difference signal;

l. comparing said transmitted brightfield image of step j. against said transmitted brightfield image from the same point of said second pattern to develop a transmitted brightfield difference signal; and

step f. includes the processing of said transmitted darkfield and brightfield difference signals of steps k. and l. together with said reflected darkfield and brightfield difference signals from steps d. and e. to unilaterally determine a first pattern defect list.

7. A method of inspection as in claim 6 further including the step of:

m. post processing said first pattern defect list of step f. to identify known non-performance degrading surface features therefrom.

8. A method of inspection as in claim 6 wherein step a. illumination is provided with separate darkfield and brightfield illumination sources.

9. A method of inspection as in claim 8 wherein said separate darkfield and brightfield illumination sources provide illumination of different frequencies.

10. A method of inspection as in claim 9:

wherein said darkfield illumination source provides narrow band illumination;

step b. includes the step of:

n. passing said reflected darkfield image through a spatial filter to enhance defect detection; and

o. passing said transmitted darkfield image through a spatial filter to enhance defect detection.

11. A method of inspection as in claim 1 wherein: said second pattern has known reflected darkfield images each resulting from different frequencies of darkfield illumination;

step a. includes multiple sources of darkfield illumination each having a different frequency are used to illuminate the same point of said specimen;

step b. separately detects a reflected darkfield image that results from each of said multiple sources of darkfield illumination from said first pattern; and

step d. includes comparing said multiple reflected darkfield images of step b. against said multiple reflected darkfield image from the same point of said

second pattern to develop a reflected darkfield difference signal.

12. A method of inspection as in claim 1 wherein: said second pattern has known reflected brightfield images each resulting from different frequencies of brightfield illumination;

step a. includes multiple sources of brightfield illumination each having a different frequency are used to illuminate the same point of said specimen;

step c. separately detects a reflected brightfield image that results from each of said multiple sources of brightfield illumination from said first pattern; and

step e. includes comparing said multiple reflected brightfield images of step c. against said multiple reflected brightfield image from the same point of said second pattern to develop a reflected brightfield difference signal.

13. An inspection system to inspect a first pattern on a specimen for defects against a second pattern that is intended to be the same, said second pattern has known reflected darkfield and brightfield images, said inspection system comprising:

a darkfield and brightfield illumination system to illuminate the same point of said first pattern on said specimen;

a darkfield image detector positioned to detect a reflected darkfield image from said first pattern on said specimen;

a brightfield detector positioned to detect a reflected brightfield image from said first pattern on said specimen;

a darkfield comparator coupled to said darkfield detector to generate a darkfield difference signal by comparing said reflected darkfield image from said

darkfield image detector and said reflected darkfield image from the same point of said second pattern to develop a reflected darkfield difference signal;

a brightfield comparator coupled to said brightfield detector to generate a brightfield difference signal by comparing said reflected brightfield image from said brightfield image detector and said reflected brightfield image from the same point of said second pattern to develop a reflected brightfield difference signal;

a processor coupled to said darkfield and brightfield comparators to process said reflected darkfield and brightfield difference signals to unilaterally determine a first pattern defect list.

14. An inspection system as in claim 13 further including a post processor coupled to said processor receive said first pattern defect list to identify known non-performance degrading surface features and to delete them from said first pattern defect list.

15. An inspection system as in claim 13 wherein said darkfield and brightfield illumination system includes:

a darkfield illumination subsystem; and

a brightfield illumination subsystem.

16. An inspection system as in claim 15 wherein said darkfield and brightfield illumination subsystem provide illumination of different frequencies from each other.

17. An inspection system as in claim 16 wherein:

said darkfield illumination subsystem provides narrow band illumination; and

said darkfield image detector includes a spatial filer through which said reflected darkfield image is

passed to enhance defect detection.

18. An inspection system as in claim 13 wherein:

said specimen is optically transmissive and said second pattern has known transmitted darkfield and brightfield images;

said inspection system further includes:

a transmitted darkfield image detector positioned to detect a transmitted darkfield image from said first pattern and said specimen;

a transmitted brightfield image detector positioned to detect a transmitted brightfield image from said first pattern and said specimen;

a transmitted darkfield comparator coupled to said transmitted darkfield detector to generate a transmitted darkfield difference signal by comparing said transmitted darkfield image from said transmitted darkfield image detector and said transmitted darkfield image from the same point of said second pattern to develop a transmitted darkfield difference signal;

a transmitted brightfield comparator coupled to said transmitted brightfield detector to generate a transmitted brightfield difference signal by comparing said transmitted brightfield image from said transmitted brightfield image detector and said transmitted brightfield image from the same point of said second pattern to develop a transmitted brightfield difference signal; and

said processor is also coupled to transmitted darkfield and brightfield comparators to also receive said transmitted darkfield and brightfield difference signals to process together with said reflected darkfield and brightfield difference signals to unilaterally determine a first pattern defect list.

19. An inspection system as in claim 18 further including a post processor coupled to said processor receive said first pattern defect list to identify known non-performance degrading surface features and to delete them from said first pattern defect list.

20. An inspection system as in claim 18 wherein said darkfield and brightfield illumination system includes:

a darkfield illumination subsystem; and

a brightfield illumination subsystem.

21. An inspection system as in claim 20 wherein said darkfield and brightfield illumination subsystem provide illumination of different frequencies from each other.

22. An inspection system as in claim 21 wherein:

said darkfield illumination subsystem provides narrow band illumination;

said darkfield image detector includes a first spatial filer through which said reflected darkfield image is passed to enhance defect detection; and

said transmitted darkfield image detector includes a second spatial filer through which said transmitted darkfield image is passed to enhance defect detection.

23. An inspection system as in claim 13 wherein: said second pattern has known reflected darkfield images each resulting from different frequencies of darkfield illumination;

said darkfield and brightfield illumination system includes multiple sources of darkfield illumination each having a different frequency and each illuminates the same point of said specimen;

said darkfield image detector includes separate

detectors to detect a reflected darkfield image that results from each of said multiple sources of darkfield illumination from said first pattern; and

said darkfield comparator is coupled to each of said darkfield image detectors to compare said multiple reflected darkfield images against said multiple reflected darkfield images from the same point of said second pattern to develop a reflected darkfield difference signal.

24. An inspection system as in claim 13 wherein: said second pattern has known reflected brightfield images each resulting from different frequencies of brightfield illumination;

said darkfield and brightfield illumination system includes multiple sources of brightfield illumination each having a different frequency and each illuminates the same point of said specimen;

said brightfield image detector includes separate detectors to detect a reflected brightfield image that results from each of said multiple sources of brightfield illumination from said first pattern; and

said brightfield comparator is coupled to each of said brightfield image detectors to compare said multiple reflected brightfield images against said multiple reflected brightfield images from the same point of said second pattern to develop a reflected brightfield difference signal.

25. An inspection system as in claim 13 wherein:

said darkfield and brightfield illumination system includes:

a single laser illumination source;

a beamsplitter positioned to reflect illumination from said laser downward; and

a condenser lens to direct said illumination to said specimen;

said darkfield image detector are placed at a low

angle said specimen to receive said reflected darkfield image; and

said brightfield detector is placed directly above the point being inspected on said specimen to received said reflected brightfield image through said condenser lens and beamsplitter of said darkfield and brightfield illumination system.

26. An inspection system as in claim 13 wherein:

said darkfield and brightfield illumination system includes:

a narrow band laser illumination source of a selected frequency placed at a low angle said specimen to provide darkfield illumination;

a mercury arc lamp;

a first condenser lens to receive illumination from said mercury arc lamp;

a first beamsplitter positioned to reflect brightfield illumination from said first condenser lens downward; and

a second condenser lens to direct said brightfield illumination from said beamsplitter to said specimen at the same point to which said darkfield illumination is directed;

said darkfield image detector includes:

a second beamsplitter positioned above said first beamsplitter to receive reflected illumination from said specimen through said second condenser lens and said first beamsplitter, said second beamsplitter having a dichroic coating selected to reflect darkfield image illumination originating from said laser source and permitting other illumination to pass therethrough, said second beamsplitter at an angle to reflect said darkfield image out of the path defined by said second condenser lens, and first and second beamsplitters;

a third lens to focus said reflected darkfield image from said second beamsplitter; and

a darkfield illumination detector placed to receive said reflected darkfield image; and

said brightfield detector includes:

a fourth lens positioned above said second beamsplitter and in line with said second condenser lens and said first and second beamsplitters to focus the remainder of the reflected illumination, namely the brightfield image received from said second beamsplitter; and

a brightfield illumination detector placed directly above said fourth lens to received said reflected brightfield image from said specimen.

27. An inspection system as in claim 25 wherein:

said specimen permits transmitted illumination to pass therethrough; and

said inspection system further includes:

a transmitted darkfield image detector placed at a low angle to said specimen on the said thereof away from said illumination source to receive a transmitted darkfield image from said specimen; and

a brightfield detector is placed directly below the point being illuminated on said specimen to received a transmitted brightfield image from said specimen.

28. An inspection system as in claim 26 wherein:

said specimen permits transmitted illumination to pass therethrough; and

said inspection system further includes:

a fifth condenser lens beneath said specimen to expand transmitted illumination from said specimen;

a transmitted darkfield image detector including:

a third beamsplitter positioned below said fifth condenser lens to receive transmitted illumination from said specimen through said fifth condenser lens, said third beamsplitter having a dichroic coating selected to reflect transmitted darkfield image illumination originating from said laser source and permitting other illumination to pass therethrough, said second beamsplitter at an angle to reflect said transmitted darkfield image out of the path defined by said fifth condenser lens;

a sixth lens to focus said transmitted darkfield image from said third beamsplitter; and

a transmitted darkfield illumination detector placed to receive said transmitted darkfield image; and

a transmitted brightfield detector including:

a seventh lens positioned below said third beamsplitter and in line with said fifth condenser lens to focus the remainder of the transmitted illumination, namely the transmitted brightfield image received from said third beamsplitter; and

a transmitted brightfield illumination detector placed directly below said seventh lens to received said transmitted brightfield image from said specimen.

29. A method of inspection of a first pattern on a specimen for defects against a second pattern that is intended to be the same, said second pattern has known first and second responses to at least one probe, said method comprising the steps of:

a. applying said at least one probe to the same point of said first pattern on said specimen to generate at least two responses from said specimen;

b. detecting a first response from said first pattern;

c. detecting a second response from said first pattern;

d. comparing said first response of step b. against said first resposne from the same point of said second pattern to develop a first response difference signal;

e. comparing said second response of step c. against said second response from the same point of said second pattern to develop a second response difference signal;

f. processing said first and second response difference signals from steps d. and e. together to unilaterally determine a first pattern defect list.

30. An inspection system to inspect a first pattern on a specimen for defects against a second pattern that is intended to be the same, said second pattern has known first and seocnd responses to at least one probe, said inspection system comprising:

at least one probe to the same point of said first pattern on said specimen to generate at least two responses from said specimen;

a first response detector positioned to detect said first response from said first pattern on said specimen;

a second response detector positioned to detect said second response from said first pattern on said

specimen;

a first response comparator coupled to said first response detector to generate a first response difference signal by comparing the output from said first response detector and said first response from the same point of said second pattern to develop a first response difference signal;

a seocnd response comparator coupled to said second response detector to generate a second response difference signal by comparing the output from said second response detector and said second response from the same point of said second pattern to develop a second response difference signal;

a processor coupled to said first and second response comparators to process said first and second response difference signals to unilaterally determine a first pattern defect list.